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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

April 20, 1993

HAND DELIVER

Ms. Donna R. Searcy  
Secretary  
Federal Communications Commission  
1919 M Street, N.W.  
Washington, DC 20554

Dear Ms. Searcy:

On behalf of Capital Cities/ABC, Inc., transmitted herewith for filing with the Commission are an original and five copies of its Reply Comments in ET Docket No. 92-298.

If there are any questions in connection with the foregoing, please contact the undersigned.

Sincerely yours,

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FEDERAL COMMUNICATIONS COMMISSION  
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Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

In the Matter of	)	
	)	
Amendment of the Commission's	)	ET Docket No. 92-298
Rules to Establish a Single AM	)	
Radio Stereophonic Transmitting	)	
Equipment Standard	)	

REPLY COMMENTS OF CAPITAL CITIES/ABC, INC.

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Before the  
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is required to make AM a more competitive medium.<sup>1</sup> Capital Cities/ABC takes issue, however, with the assumption expressed by Motorola that "[a]doption of the C-Quam standard will benefit AM service listeners by encouraging the availability of more AM stereo receivers and transmitting facilities, thereby providing the American public with higher quality AM broadcasts."<sup>2</sup> As the attached Engineering Statement points out, the adoption of a particular AM stereo standard will not automatically result in better AM reception. With or without a stereo standard, the AM system can be revitalized only by a material improvement in AM receiver performance. Engineering Statement, paragraphs 1-3.<sup>3</sup> As former Chairman Sikes commented at the Senate hearing leading to the Congressional mandate for an AM stereo standard, although the adoption of a standard "would not hurt things," it "would not help things [in AM broadcasting], and it would result in [the

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<sup>1</sup> See, e.g., Comments of the National Association of Broadcasters ("NAB") at 2-3, 6-7; Comments of the Consumer Electronics Group of the Electronic Industries Association ("EIA") at 4-5; Report and Order 91-303, MM Docket No. 87-267 ("Report and Order"), paragraphs 2-4.

<sup>2</sup> Comments of Motorola, Inc. at 2 (emphasis added).

<sup>3</sup> See Report and Order, paragraphs 204, 206. See also NAB Comments at 7-9 (recognizing the importance of high quality AM receivers to government and industry efforts to improve AM system). Notably, although the receiver manufacturers agree that "AM radio ... faces additional problems" beyond the adoption of a stereo standard, they reject the notion of regulatory receiver performance standards, such as have already been imposed on broadcasters. See EIA Comments at 4-6; Report and Order, paragraph 206.

Commission] doing work that I do not think would be helpful."4

As to the proposed selection of the C-Ouam svstem

world position without its robust performance standards."<sup>6</sup> Whether other AM stereo systems may have more "robust" performance or other technical advantages is not addressed by Motorola. Motorola's unstated premise -- that even without proof of C-Quam's technical superiority, making a hasty endorsement of that system is preferable to pursuing the best overall AM stereo standard -- should not be relied upon as a basis for Commission action.<sup>7</sup>

As the attached Engineering Statement states, the best AM stereo standard may involve a combination of sound technical ideas from several sources. In our view, a concerted and good faith effort toward the selection of the best AM stereo standard would be more true to the purposes of the Act than blanket endorsement of one system at the expense of superior quality. A prompt but wrong decision on such an essential issue, with long-term ramifications for the AM system, would be far worse than a more deliberate, well-informed decision.

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<sup>6</sup> Motorola Comments at 3. Motorola further urges against what it predicts would be "a long, expensive and arduous standards process," without providing any technical argument that C-Quam's superior performance makes such a process unnecessary. *Id.* at 6 n.6.

<sup>7</sup> The proposed adoption of the C-Quam system in this proceeding, based merely on an assumed congruence between market dominance and technical merit, is in marked contrast to the Commission's proposal to adopt the Philips Laboratory television ghost-canceling reference signal based on objective industry test results. See Notice of Proposed Rulemaking in MM Docket No. 92-305, paragraph 15 (1992). No such testing supports the proposed endorsement of the C-Quam system.

Conclusion

For the reasons set forth above, Capital Cities/ABC urges that the Commission, before adopting the Motorola C-Quam system as the standard for AM stereo broadcasting and banning all other systems, consider the technical limitations imposed by that choice, and not lose sight of the fact that the AM stereo standard designation is only part of the substantial technical improvement necessary to revitalize the AM system.

Respectfully submitted,

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April 20, 1993



**ENGINEERING STATEMENT OF KENNETH J. BROWN  
IN CONNECTION WITH  
REPLY COMMENTS OF CAPITAL CITIES/ABC, INC.  
AM RADIO STEREOPHONIC TRANSMITTING STANDARD**



**ENGINEERING STATEMENT OF KENNETH J. BROWN**  
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**2. Response to Comments of Motorola.**

Motorola heavily promotes the concept of better radios through stereo. Indeed, we found the prepared statement of Motorola presented to Congress, as inserted into the record of this proceeding by OET (Transcript S. Hrg. 102-740), most interesting in this regard. Motorola cited Delco and Carver radios as the kind of improved radio to be expected by the approval of C-Quam stereo (transcript pp. 101-102). Both of these manufacturers make radios on our quality list. Motorola ignored the many C-Quam radios which do not even approach NRSC-3 or AMax quality. Motorola also completely ignores the Denon TU-660 and other products which fully meet NRSC-3 and are monaural. The GE Superradio III, which sells for approximately \$50, is monaural and fully meets NRSC-3. Contrary to Motorola's claims, sound quality and stereo are not necessarily related. The only relationship occurs due to three factors; a manufacturer's deliberate increase in audio quality design to show some stereo effect, the implementation of automatic variable bandwidth control in some Motorola C-Quam chips as an added feature, and, most recently, the implementation of noise blanking in some C-Quam chipsets as an added feature.

Motorola also suggests that stations using the Harris system should be required to convert to C-Quam. We suggest that the long-term good of the AM broadcast service lies with a linear system, and forced conversion from linear to nonlinear is a step in the wrong direction. The signal is sufficiently compatible on a C-Quam receiver; so long as those are the only receivers available let us leave it at that.

**3. Response to Comments of Consumer Electronics Group of Electronic Industries Association.**

The comments of EIA-CEG are no surprise at all: They advocate regulation of the broadcast industry, but no regulation of radio manufacturers, regardless of whether it will solve the problem or not. We believe it is necessary for legislators and regulators alike to recognize exactly what the unregulated receiver industry has done to the sound quality of the AM radio over the last 30 years and to recognize the damage which has been done to the entire AM broadcast industry as a result of terrible sounding radios. It is difficult for a broadcaster to damage transmission quality enough for the difference to be heard on a typical AM radio. A drastic improvement in radio quality is needed now -- not in ten years, and not to only a few radios at the top of product lines. Better receivers have been made in the recent past and some better receivers are being made now. The existence of these receivers argues against the

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concept that interference requires muddy-sounding narrowband radios; better solutions are available for a relatively small cost differential.

**4. Response to Comments of Harris Corporation.**

Harris has, clearly, given up on its superior system. We note that when the Harris system was ordered off the air by the FCC effective September 1, 1983, it was the leading system with the most stations. Although the system was allowed back on the air September 21, only three weeks later, with final resolution in Harris' favor January 3, 1984, the system never recovered its momentum. Although Harris became a Motorola licensee soon after, the advantages of a linear system over nonlinear have not been negated.

**5. Response to Comments of Hazeltine Corporation.**

We concur particularly that laymen do not generally understand their radios and that people buying cars are more interested in the car than the radio. We have experience of salesmen and manufacturer's representatives of high fidelity equipment manufacturers who did not know that equipment available in their own product lines had high quality AM reception. The only way to be sure a consumer knows about a feature of a set is when that feature is prominently noted in product literature, is demonstrated as part of the product sales pitch, and forms a part of the purchase decision. We have seen much fanfare made of "Eight Times Oversampling" on CD players, while we have also seen salesmen claim that a radio labelled AM/FM Stereo decoded AM Stereo when it did not. Some of us who had a choice and made an informed choice chose multisystem receivers -- when they were still available.

**6. Response to Comments of David L. Hershberger.**

These may well have been the most thoughtful and insightful comments filed on the comparison of various AM stereo systems. The only disadvantage of linear ISB compared to linear quadrature of which we are aware is cost of implementation, and we are not so sanguine as Mr. Hershberger regarding inexpensively overcoming that disadvantage. We do recognize the validity of Mr. Hershberger's comments concerning synchronous operation. We all agree that linear systems do not have the distortion problems that nonlinear systems have (see also Appendix E of Report and Order FCC 82-111 in Docket 21313, adopted March 4, 1982, already cited in the Technical Comments prepared by Alfred E. Resnick, P.E., to accompany ABC's opening Comments in this proceeding).

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Mr. Hershberger's discourse on stereo decoding in receivers is quite good and agrees with our own experience with the early Sony SRF-A100 multisystem receiver, especially as to the stereo effect present with any system into either decoder and the difficulty in setting the decoder select switch unless one knew which system was being transmitted.

We believe that the only advantage linear quadrature AM Stereo has over ISB is that a somewhat better stereo effect can be obtained with present receivers. We are most concerned that the linear option not be precluded from the future.

We believe that the Commission should not necessarily choose a system from the submissions made because a superior system could involve a combination of sound technical ideas -- some submitted, some not -- that involve several intellectual property owners. How can this sort of dilemma be resolved? Certainly not at the Commission within the time constraints of this proceeding. It is too bad that everyone involved here couldn't be brought into a committee situation and not excused until an agreement were reached. The TV MTS resolution was reached in a very similar manner.

**7. Two minor corrections to Mr. Resnick's statement in the ABC opening Comments.**


First, the reference to the receiver article by Campbell in QST Magazine was in error. The reference should read as follows:

Campbell, R.  
High Performance Single-Signal Direct-Conversion Receivers  
QST Magazine, Jan 1993 pp 32-40

The article by Campbell in the April issue of QST magazine concerned a phasing type SSB exciter and only mentioned receivers in passing and in the bibliography.

Second, the equations shown in the original comments contained typographical errors. These errors noted to date have been corrected and several additional corrections have been made to improve the readability of these expressions. The corrections made are in no way intended to change the original meaning of the expressions. The corrected expressions appear as Exhibit 1.

DATED: April 19, 1993

  
Kenneth J. Brown

Reply Comments of Capital Cities/ABC, Inc.  
 In the matter of  
 NPRM ET 92-298  
 Editorial corrections to equations provided in comments

Exhibit 1

$$E_c = A_c \left[ \left[ 1 + m \sum_{n=1}^{\infty} C_{sn} \cos(\omega_{sn}(t) + \phi_{sn}) \right] \cos \omega_c t \right. \\ \left. + \left[ m \sum_{n=1}^{\infty} C_{dn} \cos(\omega_{dn}(t) + \phi_{dn}) \right] \cos(\omega_c(t) + \pi/2 + 0.05 \sin 50\pi t) \right]$$

(A sum of terms)

Or

$$E_c = A_c \operatorname{Re} \left[ 1 + m \sum_{n=1}^{\infty} C_{sn} \cos(\omega_{sn}(t) + \phi_{sn}) + j m \sum_{n=1}^{\infty} C_{dn} \cos(\omega_{dn}(t) + \phi_{dn}) \right]$$

$$\cos \left[ \omega_c t + \tan^{-1} \left[ \frac{m \sum_{n=1}^{\infty} C_{dn} \cos(\omega_{dn}(t) + \phi_{dn}) + 0.05 \sin 50\pi t}{1 + m \sum_{n=1}^{\infty} C_{sn} \cos(\omega_{sn}(t) + \phi_{sn})} \right] \right]$$

(A product of terms)